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In re Application of : NITZAN, Boaz et al.  
Notice of Allowance : January 27, 2004  
(CONFIRMATION NO. 7527)  
Serial Number : 09/822,500  
Filed : April 2, 2001  
For : OFFSET PRINTING PLATE FOR DIRECT  
INKJET CTP

OK to  
enter.  
G.W.

Group Art Unit 1751  
Examiner: WEBB, Gregory E.

Tel-Aviv, Israel  
April 21, 2004

Commissioner of Patents and Trademarks  
Washington D.C. 20231

Dear Sir;

PETITION TO AMEND AFTER NOTICE OF ALLOWANCE  
PURSUANT TO 37 CFR 1.312

Pursuant to the Notice Of Allowance dated January 27, 2004, it is requested that the following corrections be made to the text of the specification:

Kindly amend page 9, paragraphs 4-6 as follows:

Figures ~~1a-e~~ 1A-C show an enlarged sectional view of a negative working printing plate as known in the prior art;

Figures ~~2a-e~~ 2A-C show a prior art laser ablation process used in imaging infrared sensitive computer-to-plate litho plates;

Figures ~~3a-b~~ 3A-B show the drop-wise deposition of the inkjet fluid on an uncoated plate according to a prior art method;

Kindly amend page 10, paragraphs 1-2 as follows:

Figures ~~3c-e~~ 3C-E show the drop-wise deposition of the ink jet fluid on a plate coated with solution containing cationic surfactants according to a prior art method; and

Figures ~~4a-d~~ 4A-D illustrate the anodized aluminum plate surface treatment, of the present invention.

Kindly amend page 10, paragraph 3 as follows:

Referring now to Figures ~~1a-e~~ 1A-C, there is shown an example of the widely used prior art process of platemaking with pre-sensitized plates. As shown in Figure 1A, film 20 contains in negative form the image to be printed. Film 20 is used to image pre-sensitized printing plate 22. Plate 22 consists of a grained anodized aluminum substrate 24 which has been coated with coating 26 which contains a photosensitive pre-polymer with a carrier resin. Film 20 is placed in emulsion-to-emulsion contact with the pre-sensitized plate 22 and flood-irradiated with ultraviolet light (UV) 28 as shown in ~~figure~~ Figure 1B. Transparent areas 30 of negative film 20 represent the image areas to be printed and permit the penetration of UV light 28 causing photopolymer coating 26 to form hard, insoluble oleophilic area 32. Black areas 34 of film 20 corresponding to

the background areas of the print, prevent UV light 28 from penetrating and photopolymer coating 26 remains in the prepolymer state. Negative film 20 is then removed and the plate is processed - usually with a high pH aqueous solution in which the unpolymerized portions of coating 26 are readily soluble. This exposes the grained anodized surface of aluminum substrate 24 and provides the hydrophilic background areas for the printing plate, as shown in Figure 1C.

Kindly amend page 11, paragraphs 1-3 (onto page 12) as follows:

Figures ~~2a-e~~ 2A-C show a simplified infrared ablatable computer-to-plate process as known in the prior art. In ~~figure 2a~~ Figure 2A, plate substrate 36, which may be, by way of example, aluminum, is coated with an infrared (IR) absorbing coating 38. Another possible plate substrate is polyester. Layered on top of coating 38 is hydrophilic coating 40. Plate Substrate substrate 36 is imaged by digitally modulated IR radiation 39 that is absorbed by layer ~~26~~ 38 as shown in Figure ~~2b~~ 2B. The energy absorbed causes an extremely fast rise in temperature, resulting in ablation of IR absorbing coating 38, which causes hydrophilic coating 40 to also be removed. Figure 2c shows the resulting plate substrate 36 with coating 40 providing the hydrophilic background areas of the plate and the exposed parts of the surface of plate substrate 36 providing the oleophilic image parts of the plate.

Figure ~~3a~~ 3A shows the prior art method of ink jet system 42 jetting fluid onto the surface of uncoated plate substrate 44. This plate substrate may be any type of substrate known to the art from which offset litho plates are fabricated. It must have a hydrophilic surface with no pre-coating on it. The preferred substrate is aluminum-based with grained, anodized surface 46. Although any type of ink jet system is useful in this invention, the figure shows a generic impulse (drop-on-demand) system 42 as this is the preferred system. The inkjet fluid is deposited in a pattern that is digitally determined to provide the

information that will be contained in the plate directly from a computer.

Due to the high surface energy of anodized grained aluminum surface 46, spreading of the water-based liquid drops 44 48 occurs. Spreading can be restrained by the viscosity of the CTP liquid, as described in Israeli Patent Application No. 132789 (and the parallel PCT application PCT/IL 00/00722). This application describes a method whereby the surface area of the drop can be limited by a change in the liquid's viscosity, yet the viscosity change mechanism for drop-restraining is plate-dependent, i.e. the same ink will give different results on different substrates or substrate finishes.

Kindly amend page 12, paragraphs 2-4 as follows:

After fluid deposition on plate substrate 44, plate 44 is heated to evaporate the water in the fluid and to fuse the resins to the substrate's grained anodized surface 46 to create a hydrophobic ink receptive image as shown in ~~Fig. 3b~~ Fig. 3B.

Quality can be further improved by coating substrate 44 with a solution containing cationic surfactants as described in US Patent Application no. 60/174713. Fig. ~~3e~~ 3C shows an inkjet system 42 depositing CTP liquid on a plate substrate 44 with grained anodized surface 46 which is coated with a very thin layer (almost monomolecular) of cationic surfactants 50. Due to the low surface energy of coated surface 50 of anodized grained aluminum surface 46, it is water repellent. Therefore, the spreading of water-based CTP liquid drops 48 is limited, meaning that the contact angle of the CTP liquid drop 48 with the interface of grained anodized aluminum 46 becomes high, as a result the spot size becomes very small and the image quality is further improved. The coating mechanism of controlling the drop spreading is not plate-dependent, so that the plate effect is cancelled. After fluid deposition, on the plate substrate 44, plate substrate 44 is heated to evaporate the water in the fluid and to fuse the resins to the substrate's coated grained

anodized interface 46 to create an excellent image quality and a strong stable oleophilic image as shown in ~~Fig. 3d~~ Fig. 3D.

After drops 48 are fused, arabic gum solution is applied to plate 44, as known in the art. Plate 44 is then placed on an offset printing machine and surfactants 50 are washed by the fountain solution prior to the printing procedure, so as to expose the grained anodized water-receptive surface 46 without causing damage to the image (Fig. 3E).

Kindly amend page 13, paragraph 1 as follows:

The present invention is described in ~~Figure 4a-d~~ Figures 4A-D. ~~Fig 4a~~ Fig. 4A shows an ink jet system 42 which is jetting fluid drops 48 onto the surface of standard anodized grained aluminum plate 44 having a high surface energy, which has been pretreated with pre-treatment liquid 52 of the present invention. Pre-treatment liquid deposition onto offset plate surface 46 may be carried out by applying a thin layer (not more than 4 $\mu$ m, wet). CTP pre-treatment liquid 52 comprises a polyvalent metallic salt or an inorganic acid, and a water-soluble polymer swelling reagent and/or a coalescence agent.

Kindly amend page 14, paragraph 2 as follows:

~~Fig 4b~~ Fig. 4B demonstrates the formation of ink dot 54 by a phase separation mechanism. Dot 54 is composed of the resin and colorant found in the CTP liquid and is attached by high adhesion forces onto the porous surface 46, of the grained anodized aluminum plate, 44. The presence of the coalescence reagent and polyvalent metal salt of the pre-treatment liquid 52 are attached (in and on top) to the porous surface 46, causing a fast phase separation of the resin and colorant from the CTP liquid 52, and creating stable dot shape 54 with good film properties.

Kindly amend page 15, paragraph 1 as follows:

~~Fig. 4c~~ Fig. 4C illustrates printed ink dot 54 on dried surface 46. After dot formation the plate is dried at high temperatures to evaporate all liquids, including CTP liquid 52 swelling reagent and/or coalescence reagent leaving a thin layer of metal salt ions 56, on the surface. Dot 54 is trapped in porous surface 46, of grained anodized aluminum plate 44, to provide ink dot 54 with strong adhesion and strong mechanical stability.

Kindly amend page 15, paragraph 3 as follows:

All the examples were made under constant conditions of commercially available uncoated, post-anodized, brushed and electrochemically grained aluminum plates and the CTP liquid as described in Israel patent application no. 132789 with a viscosity of 7.8 centipoise using the inkjet print head described in EP640481. Component concentrations are expressed by [%w/w]. The dot sizes measured on the plate are presented in ~~table~~ Table 1 (see Isr. pat. appln. per above).